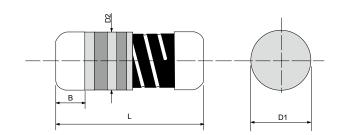


- IEC 60115-1
- EN140401-803

Features

- SMD enabled structure
- Excellent solderability termination
- Products meet RoHS requirements and do not contain substances of very high concern identified by European Chemicals Agency



DIMENSIONS

Туре	Body Length	Cap Diameter	Body Diameter	Soldering spot	Net Weight
	(L , mm)	(D1 , mm)	(D2 , mm)	(B, mm)	Per 1000 pcs
MM102	2.1 ± 0.1	1.1 ± 0.1	D1+0.02/-0.1	0.5 Min.	7 grams

■ GENERAL SPECIFICATIONS

Туре	Power Rating at 70°C	Maximum Working Voltage	Maximum Overload Voltage	Minimum Resistance	Maximum Resistance	Resistance Tolerance	Available Resistance Value
MM102 0.2W	150\/	300V	0Ω, 10Ω	221ΚΩ	±0.5%	E-192	
	0.200	0.2W 150V		0.22Ω	2.2ΜΩ	±1%~±5%	E-24 / E-96

Special sizes and specifications available on request.

PART NUMBER

Example: MM102F162RTKRTR3K0

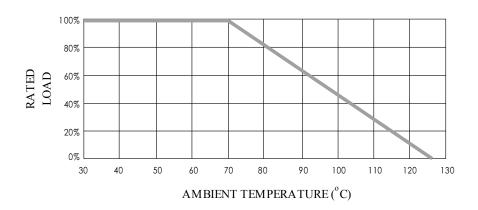
MM102	F	162R	TKR	TR3K0
Туре	Tolerance*	Resistance	TCR	Packaging
	D (0.5%) F (1%) G (2%) J (5%)	162Ω 4-character code containing - 3 significant digits 1 letter multiplier OHM MULTIPLIER R = 1 K = 10 ³ M = 10 ⁶ G = 10 ⁹	50ppm 3-character code Insert the corresponding Code for the temperature coefficient available for the specific product. TKQ = ±25PPM TKR = ±50PPM TKS = ±100PPM	5-character code TR=Tape Reel <u>MM102</u> 3K0 = 3,000 6K0 = 6,000 10K = 10,000

^{*} May not be applicable to all product types or to all resistance values. Please check with us before placing order.





POWER DERATING CURVE

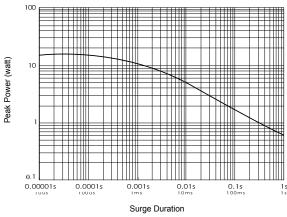


■ TECHNICAL SUMMARY

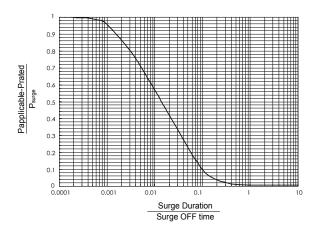
Characteristics	Limits		
Operating Temperature Range, °C	-55 ~ +125		
Temperature Coefficient, PPM / °C*	±1%, ±2%	±25, ±50, ±100	
Temperature Coefficient, PPM / C	±5%	±100	
Dielectric Withstanding Voltage, VAC or DC	150		
Insulation Resistance, $M\Omega$	>104		
Tin Whisker (JESD201 Temperature Cycling & High Temp./Humidity Storage), µm	<5		

^{*} Not applicable to all resistance values. Please check with us regarding the PPM of specific resistance value(s).

■ SINGLE SURGE PERFORMANCE



■ SURGE POWER DERATING CURVE



Notes:

- SINGLE SURGE PERFORMANCE graph is good for NON REPETITIVE applications operating in an ambient temperature of 70°C or less. For temperatures above 70°C, the graph power must be derated further linearly down to zero at 125°C.
- To determine applicable surge power in continuous-surge applications:
- 1. Identify allowable duration and peak power P_{surge} of single surge;
- 2. Determine ratio of surge duration/surge OFF time in application;
- 3. Calculate Papplicable backwardly according to Y-axis of SURGE POWER DERATING CURVE.





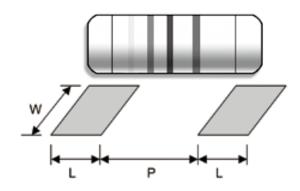
■ PERFORMANCE SPECIFICATIONS

Characteristics	Test Conditions	Limits		
	IEC 60115-1 4.13 5 seconds 2.5x rated voltage (not over max. overload voltage)		0.22Ω to 221ΚΩ	
Short Time Overload			>221ΚΩ	
	IEC 60115-1 4.25.1		ο 100Ω	± 5%
Load Life	Rated load (not over max. working voltage) 1,000 hours with 1.5 hours ON, 0.5 hours OFF, at (70±2)°C		to 221KΩ	± 2.5%
			>221KΩ	
1 11.7 1 11 12	IEC 60115-1 4.24 56 days rated load (not over max. working voltage) at (40±2)°C and (93±3)% relative humidity		0.22Ω to 100Ω	
Load Life In Humidity			>100Ω	
	IEC 60115-1 4.37	0.22Ω t	ο 100Ω	± 5%
Load Life In Humidity (accelerated mode)	1,000 hours at 85°C and 85% relative humidity with 0.1x rated voltage	>100Ω	to 221KΩ	± 3.5%
(accelerated mode)	(not over 100V)	>221KS	Σ	± 5%
Periodic Electric Overload	IEC 60115-1 4.39 3.9x rated voltage (not over max. overload voltage) with 0.1s ON, 2.5s OFF for 1,000 cycles	± 1.5%		
Resistance To	IEC 60115-1 4.18.2 Dip the resistor into a solder bath measured (260±5)°C and hold it for a 10±1 seconds		0.22Ω to 100Ω	
Soldering Heat			>100Ω	
	IEC 60115-1 4,25,3	125°C	0.22Ω to 100Ω	± 5.0%
Thermal Endurance	1,000 hours at without load		>100Ω to 221KΩ >221KΩ	± 1.5%
	ITO 001/F 1 4 10		5 cycles	± 2.0%
Thermal Shock	IEC 60115-1 4.19 -55°C 30minutes, +125°C 30minutes	,		±2.0%
Single pulse high voltage overload	 IEC 60115-1 4.27 5 pulses of 1.2/50µs at 10x rated voltage (not over max. overload voltage) with interval of 12 sec. 10 pulses of 10/700µs at 10x rated voltage (not over max. overload voltage) with interval of 60 sec. 	± 1.0% ± 1.0%		
Electrostatic discharge (Human body model)	IEC 60115-1 4.38 3 positive & 3 negative discharges with 1.5KV (For continuous surge application please see Surge Performance paragraph)	± 1.0%		
Climatic test	IEC 60115-1 4.23 4.23.2 - dry heat: 16 hours 125°C 4.23.3 - damp heat: 24 hours 55°C with 95% relative humidity 4.23.4 - cold: 2 hours -55°C 4.23.5 - negative air pressure: 2 hour 8.5KPa at (25±10)°C 4.23.6 - damp heat cyclic: 5 days 55°C with 95% relative humidity 4.23.7 - DC load: rated voltage at -55°C and 125°C each 1 Min.	± 2.0%		
Solderability	IEC 60115-1 4.17.2 Solder area covered after (235±3)°C/(2±0.2) seconds with flux applied	95% min. coverage		
Vibration	IEC 60115-1 4.22 Six hours in each parallel and axial direction with a simple harmonic motion having an amplitude of 1.52mm and 10 to 2,000 Hz.	±1.0%		
Bending test	IEC 60115-1 4.33 Pressing depth 2mm, 3 times	± 0.25%		
Flammability	IEC 60115-1 4.35 Needle flame test 10s	No burning after 30s		





■ SUGGESTED PAD LAYOUT

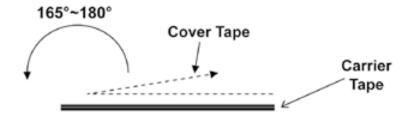


Туре	Soldering Mode	Pad Length (L, mm, Min.)	Pad Spacing (P, mm)	Pad Width (W, mm, Min.)
MM102	Reflow	0.8	0.9 ± 0.05	1.3
	Wave	1.2	0.7 ± 0.05	1.5

For better heat dissipation / lower heat resistance, increase W & L.

■ COVER TAPE PEELING SPECIFICATION

Recommended peeling force: 50gf±5gf



W

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M55342M06B4K70MS3 MC0603-511-JTW 742C083750JTR MCR01MZPF1202 MCR01MZPF1601 MCR01MZPF1800

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